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Structural Model of Academic Engagement, Rumination and Cognitive-Behavioral Avoidance: Mediating Role of Self-Efficacy

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ABSTRACT

Objective: The current study aimed to examine the structural model of the dimensions of academic engagement with rumination and cognitive-behavioral avoidance mediated by self-efficacy in high school students of Marvdasht (Iran).

Methods: The present study is applied research according to its purpose and based on its nature, it is a correlational study using structural equation modeling method. The population included all female high school students in Marvdasht in 2022. The sampling method was a multi-stage cluster in which 300 people were selected. The Sherer's Genenal Self-Efficacy Scale (SGSES), Ottenbreit & Dobson's Cognitive Behavioral Avoidance Scale, Nolen-Hoeksema's Rumination Scale and Shuffle and Becker Academic Participation Scale.

Results: Results showed that academic engagement has a significant relationship with rumination and cognitive-behavioral avoidance. Also, rumination and cognitive-behavioral avoidance based on the mediating role of self-efficacy were able to predict academic engagement. According to the fit indices, the final model showed a good fit to the data.

Conclusions: Recognizing the pivotal role of self-efficacy as a mediator underscores the significance of interventions aimed at strengthening students' belief in their abilities. This holistic approach to student support can lead to improved academic engagement and mental well-being, ultimately benefiting both individual students and the broader educational community.

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Introduction

One of the educational components that has received theoretical and research attention in recent decades is academic engagement (Pirkoman et al., 2021). Academic engagement is one of the most determinant indicators of learners' academic progress and encompasses three dimensions: behavioral, emotional, and cognitive engagement. The behavioral dimension of academic engagement refers to observable behaviors such as spending time on studying, making effort, and persistently attending to academic tasks. The emotional dimension of academic engagement encompasses learners' emotional reactions towards subjects, the school environment, and educators. Cognitive engagement, as the final dimension of academic engagement, includes a spectrum of cognitive and metacognitive processes such as thinking, reasoning, and decision-making, broadly categorized into cognitive and metacognitive processing strategies (Torabi & Nikookar, 2021).

Apart from the three dimensions of behavioral, emotional, and cognitive engagement, there is another dimension known as agency within academic engagement. Agency represents an individual's level of participation and collaboration in the learning process. When this active dimension is present, individuals voluntarily engage in the learning process and invest more time and effort to achieve enhanced learning outcomes (Sadeghi Far et al., 2020). The higher the level of academic engagement an individual exhibits, the better their academic performance and their ability to manage academic tasks on a higher level. Positive emotions, interest in studying, and strong processing abilities also contribute significantly to the quality of learning when they are present (Boudan et al., 2019).

Various factors play a role in determining students' academic engagement, among which cognitive rumination and cognitive-avoidance behavior can be highlighted. Cognitive rumination is a type of continuous and conscious mental engagement with a specific topic or thought. It is challenging to control and manage and, apart from disturbing individuals' cognitive security and psychological well-being, it can have a detrimental impact on their academic functioning. Cognitive rumination, when it becomes academic in nature, renders individuals indifferent and less motivated towards their studies, thereby significantly reducing their motivation to engage in academic tasks. Such cognitive experience decreases academic enthusiasm, efficacy, and participation, preventing individuals from designing and executing constructive plans in this domain (Yari et al., 2019).

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Apart from cognitive rumination, another factor that could contribute to explaining the process of students' academic engagement is cognitive-avoidance behavior. Cognitive avoidance is a cognitive and behavioral strategy through which individuals deliberately avoid thinking about a specific topic or purposeful behavior, showing no inclination to confront it. Individuals usually resort to this strategy out of fear of experiencing anxiety, striving to preserve their mental and functional well-being. Over time, the internalization of this detrimental strategy reduces individuals' planning capabilities and undermines their efficacy in performing various activities (Dabson & Dabson, 2018). This cognitive-behavioral pattern also provides the groundwork for maladaptive outcomes in the academic dimension. Cognitive-avoidance behavior leads to a situation where academic tasks and school attendance are not only devoid of pleasure for students but are also accompanied by tension. When individuals experience various forms of punishment and distressing stimuli throughout their education, studying becomes increasingly stressful for them, and they try to avoid confronting it as much as possible. Cognitive-avoidance behavior from academic tasks undoubtedly results in a reduction in individuals' learning levels and significantly disrupts their academic performance (Sharifirigi et al., 2018). In general, cognitive-avoidance behavior contributes to the fluctuation of students' academic engagement levels. Additionally, its interaction with cognitive rumination can play an effective role in comprehensively explaining students' academic engagement.

However, the question that arises here is which mediating variables could influence such interaction? If an individual possesses a specific characteristic or ability, will the relationship between the aforementioned variables be affected?

One of the determinants that affect students' academic performance is self-efficacy (Di Giunta et al., 2018). Academic self-efficacy refers to an individual's confidence in their ability to handle academic tasks (Yakoyama, 2019). Self-efficacy is the initiator of motivation and willpower. As long as individuals are not confident in their ability to perform a specific task, they are not inclined to perform it (Dishman et al., 2019). Besides the complexity and multidimensionality of the factors influencing the formation of self-efficacy, its absence can lead to a range of developmental malfunctions and psychological and systematic damages. Among these damages, a significant one is the decline in the quality of academic performance (Yakoyama, 2019). Students with low self-

efficacy lack significant confidence in their ability to perform academic tasks at their best, which disrupts their learning level and delays their achievement of desirable outcomes. Alaikhorram et al. (2012) reported in their study that the lack of self-efficacy is one of the reasons for failure and academic decline, and strengthening it can lead to improvements in this area.

Taking into account the provided context, it is evident that cognitive rumination and cognitive avoidance behavior play roles in academic engagement. Simultaneously, self-efficacy also exerts an impact on students' academic performance and involvement. Within this context, the central research inquiry revolves around whether self-efficacy can act as a mediator in the connection between cognitive rumination, cognitive avoidance behavior, and academic engagement.

Materials and Methods

The present research design is quantitative, cross-sectional, and employs the correlation method. The model design was carried out using Structural Equation Modeling (SEM) through path modeling. The statistical population of this study consisted of all high school students in the city of Marvdasht (Iran) in 2022. The sampling method employed in this research was multistage cluster sampling. The number of female high school students in Marvdasht was 10,711 (Marvdasht Education Department). In this study, there were four general variables and 9 subscales. If members are selected based on the general variable, a sample size of 60 is sufficient to obtain valid results. If the subscales are considered, a sample size of 125 is sufficient for valid results. However, for ensuring the adequacy of the sample size, obtaining valid data, and considering the sensitivity of the AMOS software, 300 students who met the sample entry criteria were selected by the researcher. Their questionnaires were distributed and collected after completion. The sample entry criteria included being a female student, a high school student, having good mental health, and willingness to participate in the research. The data collection tools were as follows:

1 .General Self-Efficacy Scale (GSES): The General Self-Efficacy Scale was designed and validated by Schwarzer et al. (1982) to assess individuals' self-efficacy and their confidence in their own performance. This scale uses 17 questions based on a 6-point Likert scale ranging from strongly disagree to strongly agree, with scores ranging from 0 to 5 (Alaikhorram et al., 2012). Higher scores indicate higher self-efficacy, and conversely, lower scores indicate weaker self-efficacy (Azizi Abarqooei, 2008). Schwarzer et al. (1982) reported reliability using Cronbach's

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alpha and split-half methods as above 0.70 and 0.61, respectively. In Iran, Karamati and Shahararai (2004) reported the reliability of this scale to be above 0.85 based on Cronbach's alpha. Similarly, Alaikhorram et al. (2012) reported the reliability of this scale to be around 0.91 using Cronbach's alpha, along with acceptable content and structural validity. In the present study, the Cronbach's alpha for the General Self-Efficacy Scale was 0.65.

2 .Cognitive-Behavioral Avoidance Scale (CBAS): The Cognitive-Behavioral Avoidance Scale was designed by Ettner and Dobson (2004) to evaluate individuals' cognitive-behavioral avoidance tendencies. It was adapted and validated by Ataii et al. (2013) in Iran. The scale consists of 31 items and includes four subscales: behavioral-social avoidance, behavioral-non-social avoidance, cognitive-social avoidance, and cognitive-non-social avoidance. The scale uses a 5-point Likert scale from strongly disagree to strongly agree, with scores ranging from 1 to 5. The total scores range from 31 to 155, indicating that higher scores correspond to higher cognitive-behavioral avoidance levels (Ataii et al., 2013). Ettner and Dobson (2004) reported stability and reliability for this tool to be around 0.91 for the comprehensive scale and 0.86, 0.75, 0.78, and 0.80 for the subscales behavioral-social avoidance, behavioral-non-social avoidance, cognitive-social avoidance, and cognitive-non-social avoidance, respectively. Ataii et al. (2013), who performed the translation and normalization of this questionnaire, acknowledged that the reliability of this scale and its subscales using Cronbach's alpha is between 0.84 and 0.89, and they also reported a reliability of 0.64 to 0.65 based on the test-retest method. In the present study, the Cronbach's alpha for the Cognitive-Behavioral Avoidance Scale was between 0.80 and 0.87.

3. Rumination Scale Questionnaire (RSQ): The Rumination Scale Questionnaire was designed by Nolen-Hoeksema and Morrow in 1991 to assess the level of rumination in individuals from different groups. It was translated and validated in the Iranian context by Bagherinejad and colleagues in 2010. This scale consists of 22 questions and has two subscales: brooding rumination and reflective pondering. Each subscale contains 11 questions (Tarinor et al., 2003). The responses in this scale are based on a 4-point Likert scale ranging from never to most of the time, with scores ranging from 1 to 4. The cutoff score for this scale is 33. If an individual's acquired score is above 33, it indicates severe rumination, and conversely (Bagherinejad et al., 2010). Tarinor et al. (2003) reported the reliability of this scale to be close to 0.80 using Cronbach's alpha, and its content and

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construct validity were acceptable. Bagherinejad et al. (2010) also reported the reliability of this tool to be 0.90 for the comprehensive scale and 0.92 and 0.89 for the brooding rumination and reflective pondering subscales, respectively. In the present study, the Cronbach's alpha for the Rumination Scale Questionnaire was between 0.86 and 0.88.

4. Academic Engagement Inventory: This questionnaire was designed and constructed by Schaufeli and Bakker in 2006 and was validated in the Iranian context by Eesazadegan and colleagues in 2009. The questionnaire comprises 9 items that evaluate three subscales: behavioral engagement, emotional engagement, and cognitive engagement. The responses in this questionnaire are based on a 5-point Likert scale ranging from never to always, with scores ranging from 1 to 5 (Saif, 2017). Schaufeli and Bakker (2006; cited in Samavi and Najarpourian, 2019) reported the reliability of this scale to be above 0.80 using Cronbach's alpha. Eesazadegan et al. (2009) also reported the reliability of this tool to be 0.79 in the Iranian context using Cronbach's alpha, and its content and construct validity were confirmed. In the present study, the Cronbach's alpha for the Academic Engagement Inventory was between 0.65 and 0.76.

Results

The findings obtained in relation to the sociodemographic characteristics of the study sample were as follows: The first grade consisted of 105 students (35.0%), the second grade included 96 students (32.0%), and the third grade comprised 99 students (33.0%). Table (1) Descriptive Statistics, Mean, Standard Deviation, and Normality Assessment of Research Variables.

Table 1. Descriptive statistics and normality assessment of research variables

Variable	Skewness	Kurtosis	Mean	SD
Behavioral engagement	-0.99	1.89	10.31	1.60
Emotional engagement	-0.45	1.05	11.08	1.88
Cognitive engagement	-0.12	0.22	10.85	2.03
Self-efficacy	-0.63	1.26	52.75	5.75
Cognitive-behavioral avoidance	0.51	1.16	70.56	13.80
Rumination	0.49	0.39	42.81	6.74

Based on the information provided in Table (1), the mean score for behavioral engagement was 31.10, emotional engagement was 11.08, cognitive engagement was 10.85, self-efficacy was 52.75, cognitive-behavioral avoidance was 70.56, and mean rumination was 42.81. Furthermore, considering that the skewness and kurtosis values of the data are between -2 and +2, the data are

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normally distributed at the 0.05 level. Table (2) Correlation Coefficients Matrix Among Research Variables

Table 2. Correlation coefficients matrix of research variables

Variable	1	2	3	4	5	6
1. Behavioral engagement	1					
2. Emotional engagement	0.53**	1				
3. Cognitive engagement	0.40**	0.52**	1			
4. Self-efficacy	0.51**	0.72**	0.62**	1		
5. Cognitive-behavioral avoidance	-0.53**	-0.65**	-0.59**	-0.72**	1	
6. Rumination	-0.52**	-0.63**	-0.53**	-0.68**	-0.69**	1

** $p < 0.01$

Table (2) presents the correlation results between academic engagement and self-efficacy with cognitive-behavioral avoidance and rumination. According to the obtained results, all calculated correlation coefficients are significant ($p < 0.01$). The correlation between academic engagement and self-efficacy with cognitive-behavioral avoidance and rumination is negative. The negative coefficients suggest an inverse relationship between academic engagement and self-efficacy with cognitive-behavioral avoidance and rumination among students.

In order to examine the model of the relationship between academic engagement, rumination, and cognitive-behavioral avoidance with the mediating role of self-efficacy among high school students, structural equation modeling using path analysis was employed. Model fit indices are presented in the table 3.

Table 3. Model fit indices

Fit indices	Accepted value	Obtained value	Result
IFI	> 0.90	0.97	Suitable
GFI	> 0.90	0.97	Suitable
SRMR	< 0.08	0.027	Suitable
CFI	> 0.90	0.97	Suitable
NFI	> 0.90	0.97	Suitable

The ratio of the chi-square to degrees of freedom (χ^2/df) is 1 to 5, indicating a good fit of the model with the data. The square root of the mean squared residual (SRMR) is 0.270, which is smaller than the criterion (0.080), thus confirming the model fit. Moreover, the IFI, CFI, GFI, and NFI

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indices are greater than the target criterion (0.900). Considering the cumulative model fit indices, the model of the mediating role of self-efficacy in the relationship between academic engagement and rumination, and cognitive-behavioral avoidance is confirmed. In table 4 the direct path coefficients of the effects of academic engagement on rumination and cognitive-behavioral avoidance were provided.

Table 4. Direct path coefficients of the effects of academic engagement on rumination and cognitive-behavioral avoidance

Path			Beta	T value	p
Cognitive engagement	to	Rumination	-0.17	-3.56	0.001
Emotional engagement	to	Rumination	-.019	-3.20	0.001
Cognitive engagement	to	Rumination	-0.13	-2.61	0.009
Behavioral engagement	to	Cognitive-behavioral avoidance	-0.15	-3.47	0.001
Emotional engagement	to	Cognitive-behavioral avoidance	-0.19	-3.47	0.001
Cognitive engagement	to	Cognitive-behavioral avoidance	-0.19	-4.56	0.001

According to the table 4, all path coefficients related to the relationship between academic engagement and rumination, and cognitive-behavioral avoidance are negative and significant ($p < 0.001$). Given the significance of the obtained coefficients, the research hypothesis regarding the relationship between academic engagement, rumination, and cognitive-behavioral avoidance among high school students is confirmed.

To determine the statistical significance of the mediating role of self-efficacy in the relationship between academic engagement and rumination and cognitive-behavioral avoidance, the bootstrap method was used (table 5).

Table 5. Indirect effects of academic engagement on rumination and cognitive-behavioral avoidance through self-efficacy

Indirect path			Beta	p
Behavioral engagement	Self-efficacy	Rumination	-0.045	0.05
Emotional engagement	Self-efficacy	Rumination	-0.19	0.01
Cognitive engagement	Self-efficacy	Rumination	-0.12	0.01
Behavioral engagement	Self-efficacy	Cognitive-behavioral avoidance	-0.047	0.05
Emotional engagement	Self-efficacy	Cognitive-behavioral avoidance	-0.19	0.01
Cognitive engagement	Self-efficacy	Cognitive-behavioral avoidance	-0.12	0.01

According to the obtained results in Table (5), the coefficients related to the indirect effects of academic engagement on rumination and cognitive-behavioral avoidance through the mediating variable of self-efficacy are significant ($p < 0.05$). Therefore, the research hypothesis regarding

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the mediating role of self-efficacy in the relationship between academic engagement, rumination, and cognitive-behavioral avoidance among high school students is confirmed.

Discussion

The aim of the current research was to design a model on the dimensions of academic engagement with cognitive rumination and cognitive-behavioral avoidance, mediated by students' self-efficacy. The results obtained indicate a significant relationship between academic engagement and cognitive rumination, as well as cognitive-behavioral avoidance. Furthermore, the variables of cognitive rumination and cognitive-behavioral avoidance are capable of predicting academic engagement through the mediating role of self-efficacy. In total, considering the cumulative model fit indices, the model's fit confirms the mediating role of self-efficacy in the relationship between academic engagement and cognitive rumination, and cognitive-behavioral avoidance.

Regarding the congruence or incongruence with previous findings, research investigations have shown that these findings are somewhat consistent with the results obtained from the studies by Yari et al. (2019), Yakoyama (2018), Sharifi-Rigi et al. (2018), and Samadi et al. (2019).

In explaining the fitness of the proposed model and the relationship between academic engagement, cognitive rumination, and cognitive-behavioral avoidance with the mediating role of self-efficacy among secondary school students, it can be stated that cognitive rumination gradually leads to maladaptive functioning in individuals and significantly impairs their performance in handling tasks, including academic tasks. Cognitive rumination results in the loss of an individual's cognitive processing capacity, making them unable to focus on various activities, including academic ones. This disruption hampers their ability to perform these activities effectively, leading to a lack of sufficient quality in their work. Continuous failure and difficulty in task performance negatively affect an individual's self-concept and self-efficacy, destabilizing their sense of competence (Yari et al., 2019). The disruption of self-efficacy subsequently hampers academic performance and consequently diminishes the level of learning (Yakoyama, 2019). Soleymani-Far et al. (2014) reported in their research that the disruption of cognitive functioning due to cognitive rumination reduces an individual's cognitive engagement and prevents them from organizing their academic tasks effectively. Cognitive rumination, as mentioned earlier, gradually leads to maladaptive functioning and significantly impairs an individual's ability to manage their tasks,

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including academic responsibilities. Such a situation leads to a disruption in an individual's ability to perform these activities, and the work they engage in lacks sufficient quality. Continuous failures in task completion gradually undermine an individual's self-perception and self-efficacy, thereby disturbing their self-efficacy.

Cognitive-behavioral avoidance, similar to cognitive rumination, also plays a detrimental role in impairing an individual's functioning in various dimensions of life. Continuous avoidance prevents individuals from engaging in activities and plans in a timely and desirable manner. Individuals who are trapped in this behavioral pattern experience anxiety about engaging in many activities, leading to their reluctance to face them (Ataie et al., 2013). One dimension influenced negatively by cognitive-behavioral avoidance is academic performance (Sharifi-Rigi et al., 2018). Continuous avoidance leads to a decrease in the quality of many tasks and plans performed by an individual. When an individual truly experiences that they cannot perform many of their roles across different dimensions of life at a desirable level, their self-perception becomes negative, and their level of self-efficacy decreases. The decrease in an individual's self-efficacy can negatively affect their performance in managing tasks and responsibilities across different dimensions of life.

Cognitive engagement and cognitive-behavioral avoidance have a close and reciprocal interaction. Continuous avoidance from situations affected by stress gradually reduces the cognitive engagement level of individuals and diminishes their inclination and motivation to cognitively focus on that situation (Ataie et al., 2013). Continuous cognitive-behavioral avoidance from academic situations results in an individual experiencing numerous failures, disrupting their level of self-efficacy, and hindering their effective handling of tasks in this domain (Sharifi-Rigi et al., 2018). Persistent avoidance and the decline in the quality of academic performance gradually disrupt an individual's academic self-efficacy, negatively altering their cognitive perception of themselves. The negative alteration in cognitive perception of their academic performance creates cognitive engagement difficulties and impairs their capacity for cognitive processing of academic information. Inadequate constructive response to academic tasks predicts academic distrust and, by disturbing an individual's cognitive and analytical abilities, paves the way for various academic issues (Sharifi-Rigi et al., 2018). The behavioral and cognitive abilities required for managing academic tasks demand various prerequisites, with one of the most important being self-efficacy and an individual's level of confidence in themselves. The lower the level of self-efficacy, the more

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the quality of an individual's cognitive and behavioral functioning in handling tasks in this domain is disrupted. In general, the findings demonstrate that academic engagement has a significant inverse relationship with cognitive rumination and cognitive-behavioral avoidance. Furthermore, cognitive rumination and cognitive-behavioral avoidance have the mediating role of self-efficacy in predicting academic engagement. Overall, considering the calculated fit indices and model fit, the mediating role of self-efficacy in the relationship between academic engagement and cognitive rumination and cognitive-behavioral avoidance is confirmed. Based on the obtained results, it is possible to design and implement programs aimed at reducing cognitive rumination and cognitive-behavioral avoidance. Improving these indicators can enhance academic engagement through strengthening self-efficacy and, in turn, promote greater academic progress.

Every study, although fundamentally seeking to establish connections between factors and their impact levels, is inherently constrained by limitations that arise along its path, posing challenges to internal stability and the power of generalizing results. Some limitations of this study constrain the generalizability of its results: Firstly, like many other studies, the present research may encourage participants to rely on self-reporting tools instead of actual behavior, possibly due to the use of socially endorsed and avoidance-based methods instead of behavioral study. Secondly, in this study, a cross-sectional design was employed to analyze the relationships among multiple variables within the proposed conceptual framework. Therefore, the repetition and expansion of these findings necessitate the application of longitudinal designs. Additionally, given that a structural equation modeling approach was employed to evaluate the proposed model, caution must be exercised in drawing causal inferences.

It is suggested that future researchers conduct this study on a sample of both genders and in different educational stages, using data collection methods other than questionnaires. Furthermore, in future research, apart from self-efficacy, the role of other mediating variables in explaining the relationship between academic engagement and cognitive rumination and cognitive-behavioral avoidance should be assessed. Finally, it is recommended that active counseling centers at the school level design programs aimed at reducing cognitive rumination and cognitive-behavioral avoidance among secondary school students. Strengthening these dimensions can increase students' self-efficacy and consequently enhance their level of academic engagement. Increased

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academic engagement, in turn, largely guarantees the achievement of academic goals and progress in this domain.

Data availability statement

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author.

Ethics statement

The studies involving human participants were reviewed and approved by ethics committee of university.

Author contributions

FH, BHM, MS, AN, MS and ES contributed to the study conception and design, material preparation, data collection and analysis. The author contributed to the article and approved the submitted version.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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